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E-governance in cities

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Abstract
This paper describes and analyses the way European urban policymakers guide their city into the information age. We develop an analytical framework to be able to analyse, assess and compare urban ICT policies. In the empirical part, the frame is applied to a number of cities.We conclude that the most successful cities apply a balanced mix of content, infrastructure and access policies. Furthermore, success depends on the capacity of urban management to engage in local networks with local companies, citizens and intermediary organisations, as well as their ability to mobilize external resources.

1. INTRODUCTION

The information society is assumed to change almost everything, from commuting patterns to economic structures, from the location factors of business to social relations, and all of these changes manifest themselves in cities. They affect urban structures, forms, hierarchies, economies and societies. The development and application of ICTs (information and communication technologies) lies at the heart of these transformations. ICTs can be described as the melting of computer technology, telecommunications, electronics and media (Van Rijsselt and Weijers, 1997). Examples of new ICTs are the personal computer, but also the Internet, mobile telephone, cable television and electronic payment systems are included. In the last decade, innovations in communications and information technology have been introduced at rapid speed (Castells, 1996, Forrester, 1996).

There is now an growing literature about the way ICTs are changing cities. In this paper, we want to contribute this debate. In our approach, we intend to move away from the abstract macro-idea of "the information society", but instead stress diversity and the "couleur locale" of the information society, on the urban level. This approach fits in the newer strands of technology research in social sciences that focus on the context-dependency of the uptake of technologies. New technologies do not fall out of the blue sky into a homogeneous landscape, and then change it completely; their development and application is embedded in existing economic, institutional, social and spatial structures, and changes them in rather subtle ways.

Our starting point is that, for a number of reasons, the manifestation of the "information society" varies considerably from city to city. To reveal this diversity, in the first part of the paper we present a conceptual framework that helps us to unravel the local color –or flavor, if you like- of the information society in cities. We make a distinction between three manifestations of the information revolution: local electronic content, local access to new technologies, and local electronic infrastructure. We suggest some hypothesis on the interaction between the three manifestations as engine for the dynamics of the local information society. We also suggest how policy -on several levels- may influence these dynamics. The second part of the paper is about actual policy in European cities. We introduce the concept of "e-governance" to describe and analyse local ICT policy and the role of various stakeholders in it. We illustrate this with a number of examples from European cities.

This paper is based on an international comparative study into "e-governance" strategies. In six cities we have studied local ICT policies. Our case studies were Barcelona, Cape Town, Eindhoven, Manchester, The Hague, and Venice.

For our purposes (showing and analyzing the variety of local manifestations and policies of the information society), this is a good sample of cities. They are located in different countries, which may reveal the importance of the national context. They differ considerably in economic structure and performance. Some are very specialized, albeit in different sectors (e.g. Venice in tourism, The Hague in administrative functions), others have a more diversified economy. As could be expected, each of the cities has its particular focus in ICT policy. However, all the cities share a relatively high ambition level, and they expect much of the ICT policies.

For each of the cities, we started with an analysis of the available information on the local ICT situation, and official "e-strategy" documents. After that, in each of the cities we have interviewed a number of government officials responsible for the local ICT policy, as well as

private companies that are involved in the implementation of the policies. Also, we have interviewed ordinary citizens to hear their opinion as "policy receivers".

This paper is organized as follows. In section 2, we present a conceptual framework to analyse the local manifestation of the information society. In section 3, the concept of e-governance is introduced and elaborated. In the sections 4-6, we describe and analyse local e-governance practices in our case cities. Section 7 concludes.

2. LOCAL MANIFESTATIONS OF THE INFORMATION AGE

How can the local manifestation of information society be described? We make a distinction between three types of "footprints" of ICTs in urban areas: Access, content, and infrastructure. In this section, we elaborate each of them, and suggest how they interact.

Access

The first and most basic manifestation concerns the degree of ***access*** to technologies by the (various segments of) the urban population. Access to ICT has several dimensions. It includes not only the ownership of hardware devices, but also the capabilities to use information technologies, and access to the Internet (SCP, 2000; Mitchell, 1999). On several geographical levels, we can witness varying degrees of access to new technologies. On a global scale, there is a digital divide between developed world and the developing world. Within countries (both developing and developed), there are big differences between large cities and rural areas, but also among large cities. Within cities, finally, there are large differences between districts. There is now a rich and growing literature on the determinants of access to technology (see van den Berg and Van Winden, 2002, for an overview). Most accounts point at education levels and income as key factors. SCP (2000) finds that ICT adoption levels are positively related to cognitive, social and material resources of individuals.

In our case cities, we found the highest levels of access in Eindhoven and The Hague. The lowest levels are Cape Town. The levels of access to technology reflect the national situations. Within cities, big differences exist. They are largest in the divided cities of Cape Town and Johannesburg, where entire slum areas don't even have landline telephone lines. But also in Manchester and The Hague, there is a substantial digital divide between rich and poor areas.

Infrastructure

The second manifestation of the information society in cities is the ***electronic infrastructure***. The various types of infrastructures (copper, coax lines, cables, GSM, fiber optic lines) can be regarded as the transportation system carrying the bits and bytes of the information society. The infrastructure landscape in cities has changed dramatically in the last decade. Most notably, the number of electronic infrastructure networks has increased (several new mobile networks have been put in place in the last decade, but also high-bandwidth fixed lines and satellite-based systems) networks of GSM. Second, the spatial differences in infrastructure endowment have become wider, due to telecom markets liberalization and a declining importance of universal service obligations.

The quality and availability of electronic infrastructure differs both within and between cities. Typically, because of market size, larger cities are better endowed than smaller cities or rural areas, and within cities, richer neighborhoods and business districts have better infrastructures than poor neighborhoods. In this perspective, Graham (1998) notes the emergence of premium

network spaces. These are very localized areas in large cities (like London's financial district) that have superior connections both internally but also with similar places in other cities. For the location of business, particularly information-intensive service companies, the quality of broadband access is a major location factor (Healey&Baker, 2001).

Copper telephone lines are almost ubiquitous, at least in Europe. This old technology is still the infrastructure for most of the Internet traffic. Telephone lines can even bring high-speed access, using various DSL (Digital Subscriber Line) technology. However, xDSL is not available equally across space. Operators have to invest to make their networks ready for xDSL, and prefer to invest first or most in areas where the likely number of users is highest.

Table 2.1 Speed of connection of different modes

	Download	Upload
ISDN	One way: 128 Kbps; Both ways: 64 Kbps	One way: 128 Kbps; Both ways: 64 Kbps
Powerline	1 Mbps- 2 Mbps	1 Mbps- 2 Mbps
ADSL	6-8 Mbps max	640 Kbps
Cable	27 Mbps	2.5 Mbps
Fiber optic	50 Mbps – 20 Gbps	50 Mbps – 20 Gbps

Source: BDRC (2001)

In The Netherlands and the UK, the supply of xDSL is unequally spread; in some neighborhoods, there is only one supplier, in others, there are several, and in some neighborhoods, xDSL is not available at all[1]. The situation for cables –constructed for television but increasingly used for broadband Internet- is slightly different. In some countries (the Netherlands, for instance), the cable network has coverage of almost 100%; Cable Internet is available in all the major cities, but not in some rural areas. In other countries (UK, France), there are big differences in coverage between large cities and rural areas. Within cities, some areas are cabled and others not. In Manchester, more well to do neighborhoods have a cable network, but the poor borough of East Manchester has none. Mobile networks have now become available, throughout the 1990s, in all our case studies. In some areas of our cities, more people have a mobile phone than a fixed landline connection[2]. In the near future, when high-capacity UMTS frequencies will be put into use, mobile networks are likely to become more important as conveyors of data. Another promising new technology, still in its testing stage, is the use of the electricity network for broadband data traffic. As every household has electricity, this has the potential of bringing broadband within reach for every citizen.

In our South African case, the infrastructure situation is inferior to the European one. Cape Town is said to be the "best wired" city of Africa, but nevertheless, from an international

[1] Despite policies aimed at allowing more operators on the copper networks, the dominance of the former telecom monopolists in DSL broadband is still large. In the UK, in December 2001, British Telecom had handed over little more than 160 of its telephone lines for rivals to install broadband equipment for DSL (Financial Times, December 2, 2001).

[2] This is the case in the deprived area of East Manchester. Many people were cut off form the landline because they had debts, and have switched to pre-paid mobile phones.

perspective, the IT infrastructure is poor. This is mainly due to the monopoly position of Telkom, the incumbent telecom operator. Prices are relatively high, and quality of services poor.

Content

As a third manifestation, we discern the quality and availability of ***local electronic content***. What is local content? We define it as electronically available information, interactive services or other web content related to or concerned with a specific locality. Examples of local content are the local newspaper on Internet, websites on the traffic situation in the city, information about events in the city, or the electronic services that the local administration offers to its citizens. It also includes the web sites of firms or institutes that primarily serve a local market, such as community organisations, education institutes, and non-profit organisations. Finally, it includes local virtual communities, such as self-help groups, newsgroups etc. Our case cities differ widely in the quality and quantity of local content. City administrations play a large role in the determination of the quantity and quality of local content, as they are one of the most important "suppliers" of it (more on this in section 4). But also, much depends on the local "organising capacity" of individual sectors to use the Internet as new medium to communicate with clients or as marketing tool. In Cape Town for instance, the tourism sector is very fragmented and does not co-operate in a joint website; tourist information is scattered over a large number of websites. The same holds for the Venice tourist industry. Other cities -good examples are Hamburg and Bremen- score much better in this respect, and make it easier for tourists to find their way or even book on-line. Evidently, co-operation structures are better. Also, cities differ in the liveliness of area-based spontaneous on-line communities. In some cities, we found strong and vivid virtual local communities, where citizens meet to discuss all kind of issues related to the city. The Hague's "digitale hofstad" website is a prime example. In other cities, such online communities are less active (Eindhoven) or even absent (Capetown).

Interaction and dynamics

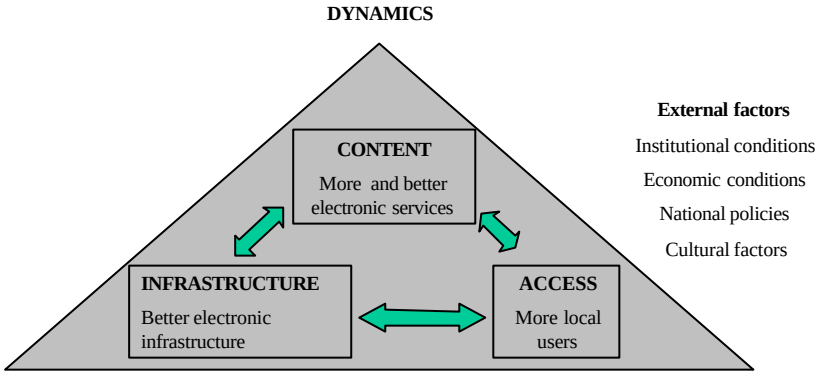
For a number of reasons, cities are different in terms of content, access and infrastructure. Nevertheless, there are communalities in the way each of the three "manifestations" have an impact on each other. There are strong indications that the three local manifestations of the information society are interdependent and sometimes mutually reinforcing. See figure 2.1. We suggest that its dynamics can be represented as a local "digital flywheel", which functions as follows. If there are more ICT users in a city, it becomes more interesting for companies or any other actors to develop new services. For instance, on-line grocers normally start their activities in areas where Internet penetration is highest. The other way around, more (or better) electronic services (content) may increase the number of local users. If there are better online products or services available, the Internet becomes more useful, and more people are likely use it. This interdependence between access and content is well known in the economic literature on technology adoption. In many instances, a "killer application" can speed up the adoption of a new technology very rapidly[3]. Probably, the quality local content is not the key factor for

[3] A recent example shows how a "killer app" can speed up the use of technology. In The Netherlands, banks have been pushing consumers to use their bank cards as electronic purse. Despite huge marketing efforts, the uptake of the electronic purse remained very low for years. Recently however, in some cities you can only pay for parking with the electronic purse. Since then, adoption levels have skyrocketed.

individual's decisions to buy a PC and go to the Internet. Nevertheless, several studies suggest that local information and services are very important for citizens.

The quality of the local electronic infrastructure is linked to both access and content. On the one hand, higher levels of access and more electronic services will increase the demand for bandwidth and make high-level (broadband) electronic infrastructure more profitable. Telecom companies are more likely to offer high bandwidth services in areas where demand is greatest. The other way around, if the quality of the local infrastructure is upgraded, this will evoke improved E-services (those which require broadband) and attract again more local users.

Figure 2.1 the "digital flywheel"



Turning the flywheel on may have beneficial impacts for a city in several fields. Improved electronic services means a higher quality of life for inhabitants: they have better access to improved amenities. E-government services may save public spending and reduce local taxes to the benefit of citizens and/or firms. The quality of local electronic infrastructure is a factor of growing importance to attract new firms and inhabitants. If a region manages to create early mass in users and infrastructure, local firms may build an innovative edge. Especially, early critical mass of users may attract innovative companies and people into the city. The system takes off when a critical mass of users is reached.

A question that comes to mind is how local really is the "local flywheel"? Clearly, its engine is not solely fuelled by local factors. External factors play an important role, too. In the first place, national institutional conditions matter. Our South African case study suggests that it makes a big difference whether the telecom market is liberalised and competitive or not. And, all other kinds of legislation influence the flywheel as well, for instance, electronic privacy and security legislation. Second, general economic conditions play a role. ICT use is strongly related to economic development levels. Richer countries and cities tend to have higher levels of access, more content to offer, and a higher quality of infrastructure. Third, national policies can strongly influence the different parts of the flywheel. Regarding access, many countries have nation-wide programmes for ICT in education or access policies for disadvantaged communities. In the field of content, national policies may encourage cities of other public entities to develop E-strategies, and thus speed up the quantity and quality of content offered.

3. THE ROLE OF LOCAL GOVERNMENTS: THE CONCEPT OF E-GOVERNANCE

Public policy with regard to ICT is often referred to as e-government. Silcock (2001) defines e-government as the use of technology by governments to enhance the access to and delivery of government services to benefit citizens, business partners and employees. The term "e-government" is strongly associated with administrative governing by a single actor. However, in this paper, we are not only interested in the uptake of ICTs by local government itself, but just as much in the role of local government in the processes of uptake of ICTs by local population, communities and businesses, and its role in infrastructure provision. It is clear that in these processes, local government has less direct competencies, and depends critically on co-operation with other actors, such as IT companies, local communities and local business sectors. It has to operate in flexible networks to get things done.

In this light, the concept of governance, developed in the institutional economic literature, is useful for our purposes. It puts less emphasis on the directive capacities of local government, and more on its ability to engage in networks with other organisations. Mistri (1999) defines governance a "the capacity of local administrations, in a dialectic exchange with social organisations and firms, to guide the growth process". Jessop (1997) describes governance as "the complex art of steering multiple agencies, institutions and systems which are both operationally autonomous from another and structurally coupled through various forms of reciprocal interdependence" (p. 95).

In this spirit, we introduce the term “e-governance” which can be described as the capacity of local administrations, in a dialectic exchange with social organisations, citizens and firms, to deploy information and communications technologies to achieve urban policy goals. An important implication of this description is the representation of ICTs not as a means in itself but as instrumental for the achievement of policy goals. In line with our distinctions in the last section, we discern three dimensions of E-governance: 1) governing local content, 2) governing local access and 3) governing local electronic infrastructure.

First, *local content governance* is the capacity of local administrations to provide, create or promote user-friendly Internet or other electronic content related to a specific locality. Examples of local content are the local newspaper on Internet, websites on traffic situation in the city, information about events in the city, or the electronic services that the local administration offers to its citizens. It also includes promotion of Internet activity of local firms, community organisations, education institutes, non-profit organisations, and even of individual citizens.
Second, *local access governance* is the capacity of local administrations to provide access to new ICTs for the urban population at large. “Access” includes not only the ownership of hardware devices, but also the capabilities to use information technologies, and access to the Internet (SCP, 2000; Mitchell, 1999).
Third, *local infrastructure governance* is the capacity of local administrations to influence the provision and spatial distribution of electronic infrastructure (copper, coax cable, broadband, and eventually other technologies).

In our e-governance concept, the composition and quality of local networks deserves generous attention. Each dimension of local E-governance involves several partners or stakeholders: typically, these are local governments, citizens and technology suppliers, but also other parties

may be involved such as other public agencies (municipal departments, financial service companies or other content providers). The different dimensions of e-governance (content, access and infrastructure) may require different approaches of network organisations. In our case-study analysis, we have put much stress on the way these networks are developed, both in the design and implementation stages of ICT policies. In each of the cities, we have checked how the private sector is involved policies, how bottom-up initiatives in the city are aligned with general visions and strategies on the urban level, and how public agencies (within the city, but also on the national and international levels) co-operate in various ICT related policy fields. In the governance concept, networks are not only a means to get things done with urban stakeholders, but can also be a powerful tool to influence the "external factors" that influence the digital flywheel.

4. GOVERNING LOCAL CONTENT

Table 4.1 summarizes the various "content policies" that we found in our case studies. We will review them here, and discuss the way stakeholders are involved in the design and implementation of the policies.

Table 4.1 Content policies

"Governing Content"	Bcn	CapeT	Eindh	Man	Hague	Ven
Bringing existing public services on-line	**	*	*	*	**	*
Create new integrated web-products	**	0	0	**	*	*
Create mobile content	0	0	0	0	*	0
Create or promote local on-line communities	0	0	*	*	**	0
Help local SMEs with introduction of e-commerce	*	*	0	*	*	*
Implement e-democracy concepts	0	0	*	*	*	0
Create or promote integrated urban portals	**	*	0	0	0	0
Help/promote grassroots organizations to go on-line	0	*	0	*	*	0

0 = No policy

* = Moderate policy efforts

**= Strong policy efforts

The first and most widespread category in the table is the use of ICT by municipalities to improve electronic service provision. In a number of cities, it is now possible to submit online forms, for instance for permits or allowances, or process other routines by electronic means. Our case studies vary considerably in the number and quality of online services they offer[4]. Some cities are more advanced than others. But also within city administrations, big differences exist. In Manchester, for instance, the housing department is the leader of the pack. On the Manchester city council website, the housing department offers a "home finder programme", which enables users to search and subscribe to houses, after typing in a number of search criteria. The site yields pictures of the homes, characteristics, as well as information on the neighborhood. Tenants can report necessary repairs online, and book a date for reparation. The

[4] This confirms the findings of many e-government surveys. See for instance, EC (2001)

system links up with systems and agenda's of suppliers (plumbers, carpenters etc.). In The Hague, the local tax department has the most advanced services. Its website allows owners and users of real estate (citizens and companies) to check the value of their objects, to obtain the taxation reports, and eventually to respond electronically. Access requires a username and a password. It is a very practical service, and widely used and known by the general public.

In providing services on-line, some cities are beginning to make the shift from a supply-orientation (where individual departments of city administrations offer their content in an online form) to demand orientated and integral solutions (the second row in the table). In this way, they make better use of the added value the Internet offers. The Hague, for instance, is implementing electronic services from a life-events perspective. For people who want to get married, a site has been designed that shows all the localities in the city where the marriage can take place, and allows for on-line reservation. Eventually, private companies may take part in this initiative as well. This example suggests that the Internet may become a trigger for new kinds of public-private co-operations in service delivery.
In the borough of East Manchester, a web service has been set up that combines the content of a variety or organizations, including the City Council, the police, health care providers and job agencies. The underlying vision is to "deliver online a wide variety of services to local residents in a manner that is appropriate to their situation and need, and which joins services up to suit individual customers and citizens" (Manchester City Council, 2001). In other words, this is a service focused on local demand instead of what suppliers happen to offer. Among other things, the portal includes the ability to make payments (ranging from parking fines to commercial rents), to report crimes; it offers online advice, and it remixes information for specific target groups. The City Council expects substantial benefits from this initiative, not only in terms of improved service delivery for the citizens of the area, but also in terms of cost savings[5].

Implementing integrated services asks for radical changes within city administrations. Evidently, it requires an integration of internal IT systems within the municipal organization[6]. But also, for the integration of services a reorganization of work-processes within city administrations is a precondition. Generally, cities lack the knowledge and resources to manage these changes processes. Therefore, they tend to engage in strategic partnerships with consultancy firms that combine expertise on ICT implementation/integration with that on organizational restructuring. The Hague works with Microsoft as key partner, Manchester with a consortium of ICL/Fujitsu and Deloitte & Touche, and Cape Town with Accenture/SAP. Our case studies reveal that cities have difficulties in finding the right partnership model. Key issues are how to share risks and returns amongst the partners, how to keep control of the change process (this is not easy for cities, as their commercial partners tend to have the better knowledge base), and how to avoid lock-in into a certain system or supplier. And, the commercial consortia are not always aware of political and bureaucratic peculiarities and sensibilities of the municipal organization.

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[5] A total cost saving of € 4.2m over a 5-year period is expected. This sum is made up of a reduced number of calls to the Housing call center, fewer manual processing of payments, a reduction of back-office and support costs at the Council, and the possibility of pooling resources among the organizations that are involved in the Eastserve project (Manchester City Council, 2001).

[6] Cape Town for instance has 270 different and often incompatible IT systems

When we compare the electronic service provision of cities with that of larger private companies in the consumer market, the performance of cities is rather poor. Little of the potential of the new technologies has been realized. Truly demand-oriented services are still an exception, and the quality of city websites is often poor compared to larger companies in the consumer market. This relative backwardness can be explained by a lack of market incentives, and the high quality requirements of public services in terms of privacy protection, identification and security. In all our case cities, national governments play a key role in setting legislation and standards in the fields of electronic identification, safety, responsibility, protection of data etc. Some of our case cities (Venice, Manchester, The Hague) feel frustrated by the poor progress of their national governments in these fields, which hampers them to develop interactive services. Interestingly, the same national governments are increasingly providing incentives to cities to speed up e-government. In the UK, the national Labour government wants to have all public services online by 2005 (DTLR, 2002). It encourages cities to do the same (in partnership models), and gives them money to do so. In competitive bidding processes, cities have to compete for nation funding schemes. In the Netherlands, three cities were appointed “superpilots”. They get substantial national funds to experiment with innovative E-services.

The table shows a number of other “content policies” of local government. A relatively new phenomenon is the provision of mobile services to citizens. In The Hague, there is a mobile SMS-service that provides travelers with real time information on public transport. A popular policy is to help or support other urban actors to create of electronic content. Manchester, for instance, supports an organization that helps local community and volunteers organizations to design and publish websites. The Hague supports SMEs implementing e-commerce solutions, by giving them free consultancy days. Cape Town has established learning centers in public libraries, where people in disadvantaged communities are helped to use new technologies. Eindhoven has a noteworthy policy to promote the creation of broadband content by local companies. Software and application developers in the city can apply for investment subsidies when they design applications for broadband. This is part of the cities remarkable strategy to kill the broadband “chicken and egg” deadlock: There is lack of broadband infrastructure because there is no useful content for which broadband access is needed, and the other way around.

The city of The Hague has a noteworthy project named “residentienet”. This website "residentienet.nl" was initiated by the local government, as a platform for the creation of digital communities. Citizens can create thematic "squares", for instance, a square for your own physical neighborhood. The site provides very simple and user-friendly tools to create these squares, but also to make homepages and participate in newsgroups. The website offers local information on events etc, as well as services. It also contains a virtual marketplace for secondhand goods, and serves as platform for discussions on issues that concern the city, such as city developments plans. Residentie.net is a joint initiative of the municipality and two telecom network operators: KPN (the incumbent telecom operator in the Netherlands) and Casema (a cable company). Despite the city’s ambitions with the project, we found that it does not operate as expected. Visitor numbers are low, and the formation of "digital squares" falls short of expectation; participation in online debates is modest, and the participation of private

companies and local organisations is disappointing. Digital shopping malls have not come into being. Evidently, Residentie.net is now not functioning as "the" virtual city of The Hague. One of the key reasons is that the technology supplier in the project, KPN, has been given a role that does not fit its competencies, namely the exploitation of the Residentie.net. Another issue is the lack of co-operation with Digitale Hofstad, an existing local community of heavy Internet users.

Eindhoven has the ambition of setting up an online community of broadband users. Private companies are interested in participating in these local virtual communities. The Rabobank, one of the largest Dutch banks, regards Eindhoven as a very interesting testbed. The company views cyberspace as a new domain where local companies and citizens interact in new ways. The E-city, with its envisioned 84,000 inhabitants always on line with broadband, could yield important lessons for the bank. It could show how interactions and transactions among citizens and companies may change in the future. For instance, banking services could become integrated part of local e-commerce.

E-democracy initiatives are taken in several of our city cases. On a basic level, most of our cities put council decisions and policy documents on-line. Eindhoven broadcasts its council sessions live on the Internet. The Hague has used its residentie.net platform to organise on-line discussions on urban renewal projects, and, recently, on youth policy. The city had a hard job getting people involved.

In our case cities, we have also studied the way cities present themselves on the Internet. Our conclusion is that fragmentation rules. Only Barcelona has a well co-ordinated website in which various key local content providers work together. None of our other case studies have a comprehensive and integrated “urban portal” where citizens, businesses and visitors are linked to the websites and information/services they are looking for. The Hague has a number of portals, each for a different purpose, but without cross-linking. In Manchester, a commercial organization organizes a portal, but the Council does not participate.

5. GOVERNING LOCAL ACCESS

In most European cities, only a minority of the citizens has a PC at home, or access to the Internet. Large groups lack basic ICT skills. Empirical studies confirm that particularly weaker social groups (unemployed, ethnic minorities, low-income groups, the elderly) show low levels of ICT adoption (SCP, 2000). People “on the wrong side of the digital divide” lack access to information and services, and do not benefit of the new possibilities, which reinforces their isolation and backwardness. Lack of ICT skills reduces their chances on the labor market. Many cities, including all our case cities, consider these low levels of ICT adoption[7] as undesirable situation, and try to speed up the adoption of ICTs. In this section, we describe what our case-cities are doing to fight this digital divide, and which urban actors they involve in their policy design and implementation.

[7] ICT adoption includes not only the ownership of hardware devices, but also the capabilities to use information technologies, and access to the Internet (SCP, 2000; Mitchell, 1999).

Some of our case cities have opened or supported special ICT centers, with the aim to help groups with low levels of ICT adoption to make the shift towards the information society. Table 5.1 shows four types of “ICT adoption policy”. Manchester has its "electronic village halls" (EVH's). They offer internet-terminals, where the Internet can be accessed free; also, numerous training and education programs are offered at low fees. Manchester counts three EVH's: one of them is area based, and functions in the deprived borough of east Manchester; the other two are directed towards specific groups, namely immigrants ("the Bangladesh house") and women (Women's electronic Village hall). The Hague has a similar ICT learning centers, based in public libraries.

Table 5.1 Access policies

	Bcn	**CapeT**	**Eindh**	**Manch**	**TheH**	**Ven**
ICT centers for special groups	**0**	**0**	*	**	*	**0**
Put Internet terminals in public places	*	*	*	*	*	*
Put PCs/Internet at schools	**0**	*	*	*	*	**0**
Offer reduced tariffs for ICT equipment/internet access	**0**	**0**	**0**	*	*	**0**
Promote broadband access	**0**	**0**	*	*	**0**	**0**
ICT training at reduced fee	**0**	*	*	*	*	*

0 = No policy

* = Moderate policy efforts

**= Strong policy efforts

Second, all our case-cities put Internet terminals in public places (libraries, or kiosks). This enables people that don’t have a PC at home to access the Internet. It is a relatively cheap type of policy.

Third, many cities allocate resources to improve PC and Internet availability at schools. In Cape Town, many schools are poorly endowed with ICT equipment. The city invests in PCs, as this is considered key to improve the chances of children in poor neighborhoods. In the weekends, some schools are opened to allow community groups to use the Internet and get IT-related training. In Cape Town, some large IT companies contribute to access policy, from a social responsibility point of view. In a community access project, an Internet provider offers Internet access for free, and a big computer company finances part of the equipment. The city Cape Town wants to make optimum use of private companies’ support in its policies. It is carefully “mapping” the digital divide, to find out which areas are particularly poorly endowed with ICTs. The study will help the city to direct private initiatives into the areas where the needs are greatest.

Fourth, some cities directly address the digital divide by offering ICT equipment at reduced prices. Manchester, in our sample, promotes individual ownership of devices and home access. In a particular area in East Manchester, citizens can get a brand new internet-ready PC with monitor and color printer for just € 317; or, a recycled PC for BP € 48, or even less for people on benefits, or an Internet-only PC for € 80, or a set-top box (enabling Internet access via TV) for free. On average, the hardware pieces are subsidized for an amount between € 317 and 476

each. In The Hague, families living on welfare can get PCs for free. Also, the city offers free Internet[8] to its citizens through the Residentie.net project.
Fifth, a relatively new type of "digital divide" policy is the promotion of broadband access. In our sample, Manchester and Eindhoven are doing this. The City Council of Manchester is building a wireless broadband Wide Area Network (WAN) in the deprived borough of East Manchester. This will enable people in the area (4,500 houses) to access the local intranet for free.

Eindhoven is promoting broadband use as well. In a designated area of 80,000 households, the city offers a demand subsidy to broadband users, regardless of the type of broadband connection (cable, xDSL or wireless). With this policy, it hopes to establish a critical mass of broadband users in the city that will be an interesting test market for broadband content providers (see section 4).
Finally, all our city cases promote the development of various ICT skills by its citizens. Interestingly, in the Hague, where courses are offered almost for free in public libraries, there is a shift in demand from basic courses (how to use a PC, how to access the net) to more sophisticated skills, for instance on web design. This marks the maturity of access in this city.

As this survey show, cities are quite active in promoting access to new technologies among weaker groups of the population, with Barcelona as noticeable exception. In Barcelona, policymakers see no role for themselves in promoting access. They are convinced that the market mechanism will do its work. The number of privately operated Internet café's is remarkably high.

There is still a debate ongoing whether (local) government should have a role in promoting ICT adoption. It can be argued that the adoption of new information and communications technologies follows a similar path as that of other high tech products such as the video-recorder or the television: the well-known S-shaped adoption curve (Leighton, 2001). When a new technology is introduced, at first the number of users of is low, and the prices are high. Next, with falling prices and improving user-friendliness of ICTs, the number of users/owners of the technology grows quickly. As time goes by, the market mechanism will provide for further adoption of ICT among people that derive value from it. Proponents of policy intervention, on the contrary, argue that ICT adoption can be of strategic importance for urban development in many respects. The returns of policy intervention to speed up adoption may, under some conditions, be high. What we can learn from the adoption literature is that efficient policies should preferably not be generic but targeted at non-adopting groups (see Van den Berg and Van Winden, 2002, or Van Winden 2001).

6. Governing local infrastructure

In the provision of local electronic infrastructure, the role of cities is smaller than in content and in access. Just a few decades ago, this situation was different. Then, cities constructed and operated cables networks –sometimes in public private partnerships-, or operated local telephone companies. In the 1990s, however, the telecom sector has been rationalized and privatized. As a consequence, the role of local governments has decreased substantially. Much

[8] Internet provision is for free, but citizens have to pay the telephone ticks

of the electronic infrastructure is owned by a small number of multinational companies, that take investment decisions based on market conditions. Nevertheless, cities try to influence the local e-infra situation in several ways. See table 6.1

Table 6.1 Infrastructure policies

	Bcn	**CapeT**	**Eindh**	**Manch**	**TheH**	**Ven**
Linking public building with broadband	*	0	*	*	*	*
Promote roll-out of new infrastructure	0	0	**	0	0	0
Create new infrastructure	0	0	0	*	0	0
Influence national telecom policy	0	*	0	0	0	0

0 = No policy
* = Moderate policy efforts
**= Strong policy efforts

All our case cities –with Cape Town as an exception- have linked municipal building with broadband lines. The reasons to do so are to save communication costs, but also to facilitate the exchange of large data packages.

Infrastructure is the cornerstone of Eindhoven's "E-city" plan. The E-city's key ambition was to connect 84,000 people (38,000 households) to broadband. Broadband was defined as 2Mbps minimum. The strategy consists of 1) promoting demand by offering discounts for broadband subcribers in the E-city area. For this, EURO 13.6 Mio is available. 2) Promoting demand by subsidizing the development of local broadband applications and services (see section 4) and 3) encourage supply of broadband by fixed, mobile and cable operators. The latter category proved the most dificult. At the launch of the project, in spring 2000, several partners showed interest, and signed up as partners in the E-city project proposal. However, after Eindhoven won the project, it proved hard to get the partners going. For one thing, some of the telecom partners – UPC, KPN- had serious financial difficulties and became more reluctant to invest in broadband infratsructure. Another partner, the Swedish Bredband, decided to withdraw from the Netherlands and concentrate its efforts on the Swedish home markets. UPC, the local cable operator, does not seem to have too much interest in investing in fibre to the home: it would cannibalise the cable internet market. At the time of writing, KPN is unable to invest given its precarious finanancial position. In sum, by the end of 2001, the prospects of Eindhoven's broadband strategy looked grim. Citizens grew impatient, because none of the promises seemed to be fulfilled.

Cape Town, our South African case study, is badly endowed with electronic infrastructure. This is mainly due to the lack of competition in the market, and the subsequent dominant position of the national telecom monopolist. There is not much that an individual city can do in this respect. Civil officers of Cape Town participate in national advisory commission, to influence telecom deregulation and liberalization.

Our most striking example of infrastructure governance comes from Manchester. In a very ambitious scheme, the City Council is now providing the deprived area of East-Manchester with a wireless broadband Wide Area Network (WAN). This will enable people in the area (4,500 houses) to access the local intranet for free. This Intranet will contain several services, among

which the Eastserve.com portal discussed in section 5. People who want to go to the Internet need to pay the normal monthly fee to an Internet service provider, of around € 24. Not only houses will be connected, but also community centers, schools and several public internet access points. A private company will roll out the network. The maximum speed will be 10MB/s. This is a high speed at almost no costs[9]. The idea behind the project is to give disadvantaged groups access to broadband Internet. Broadband enables citizens to access and use rich content (like for instance, moving images), and more personalized forms of online service provision (for instance using videoconferencing technology). Furthermore, it enables more advanced types of on-line learning.

7. CONCLUSIONS

Information technology is changing cities, but it is doing so differently in each individual city. In this paper, we intended to highlight and explain differences in the way cities are developing into the information society. In our framework, we started to discern three manifestations of the local information society: Access, infrastructure, and content. Next, in a number of case cities, we have studied how they design and implement "e-governance" policies.

Our study confirms that cities indeed are very different, on each of these dimensions. Many of the differences between our case cities can be explained not primarily by local conditions or policy but rather by differences in national conditions, such as the degree of telecom market regulation and general levels of economic development. This holds particularly for the dimensions of electronic infrastructure and access. Furthermore, national governments rather than cities set standards in the important fields of legislation on electronic identification, privacy etc. Nevertheless, one of our key conclusions is that urban policymakers have a substantial influence on the shaping the local information society.

Cities are important as providers of local content. They may create very practical and useful content that makes life easier for citizens. Our study also reveals that cities increasingly play a role in promoting content development by other actors. They promote the use of ICTs by SMEs, semi-public agencies, community organisations etc, thus speeding up the take-up of technologies in many sectors in the city. Finally, some cities try to create or promote virtual on-line communities.

New information technologies typically offer scope for functional integration, on different levels. From this perspective, all our case cities are aware that they have to engage in strategic relationships with other actors. In offering electronic government services, they have to strategically co-operate with software companies and consultants, but also with other service providers; in creating web-portals, they have to organize many actors to deliver their content; in trying to influence electronic infrastructure provision, they have to work together with telecom suppliers. In each of these cases, the role of the city is different. Our study shows that cities are struggling to define partnerships models appropriately. Partnership approaches in technology policy raise a number of new questions on the extent of public domain and responsibility. On a local level, we will see increased public private partnerships in all fields of e-governance. Future research is needed into public private co-operations in technology policy.

[9] An average ADSL user in the UK gets a speed of 512Kb/s for a monthly fee of € 40.

In our study, we found substantial differences between cities in their policy approaches. In some cities, reducing inequalities is they key idea behind its ICT policy. This holds for three of the most "divided" cities in our study: Manchester, Cape Town, and The Hague. They put much stress on helping people to get online, and develop useful electronic content for the ordinary citizen. Other cities, notably Barcelona and Eindhoven, take a more opportunity based and future oriented approach. Barcelona regards a strong web-policy as instrument for city marketing, and Eindhoven wants to build a lead as region with top-level electronic infrastructure. Primarily, it has economic motives for its E-governance strategy. Venice uses ICT primarily to strengthen its tourist product.

Cities think differently about their role vis-à-vis the market and the private sector. As a consequence, they differ in the degree to which they intervene in content, infrastructure and access. At the one extreme is Barcelona, which hardly interferes at all, from a strong belief in the working of the market. Other cities are much more active. Ramarkably, in the field of electronic infrastructure, we witness a trend of reinforced intervention of local government, after years of declining influence of local policy. Two of our case studies –Eindhoven and Manchester- are already active in improving the quality of electronic infrastructure, but others are considering it. Cities are very much aware of the critical role of infrastructure as factor to attract companies, and increasingly dissatisfied with their lack of influence on its development. Some European cities (the Dutch city of Groningen is one of them) consider to develop "open" broadband networks themselves, by extending the high-capacity optic fiber networks that link municipal buildings and engaging other actors (schools, libraries) as well. This may witness the emergence of a new kind of semi-public local telecom providers.

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